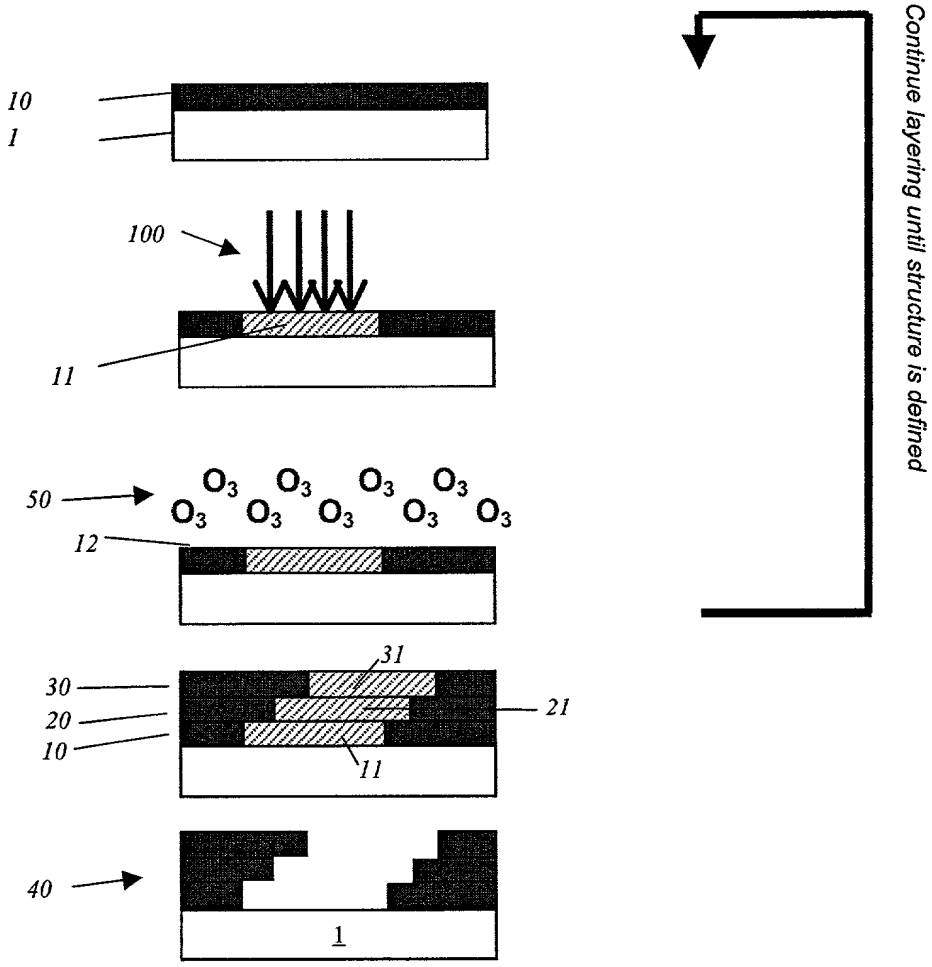

10
1
100
11
50
O3 O3 O3 O3
O3 O3 O3 O3 O3
12
31
30
20
10
21
11
40
1
Continue layering until structure is defined

Figure 1.

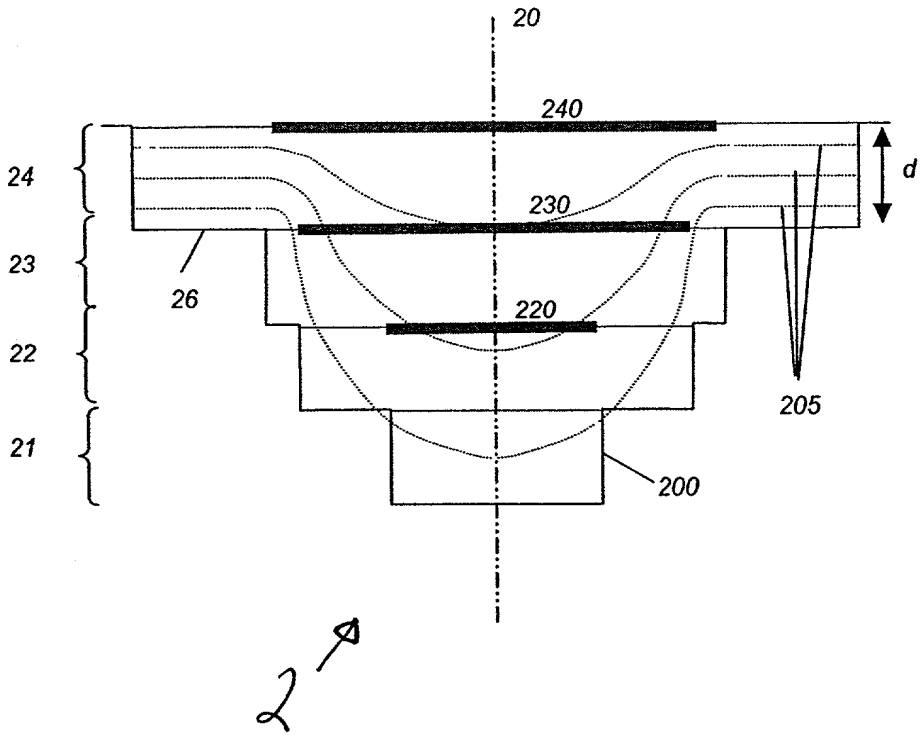


Figure 2.

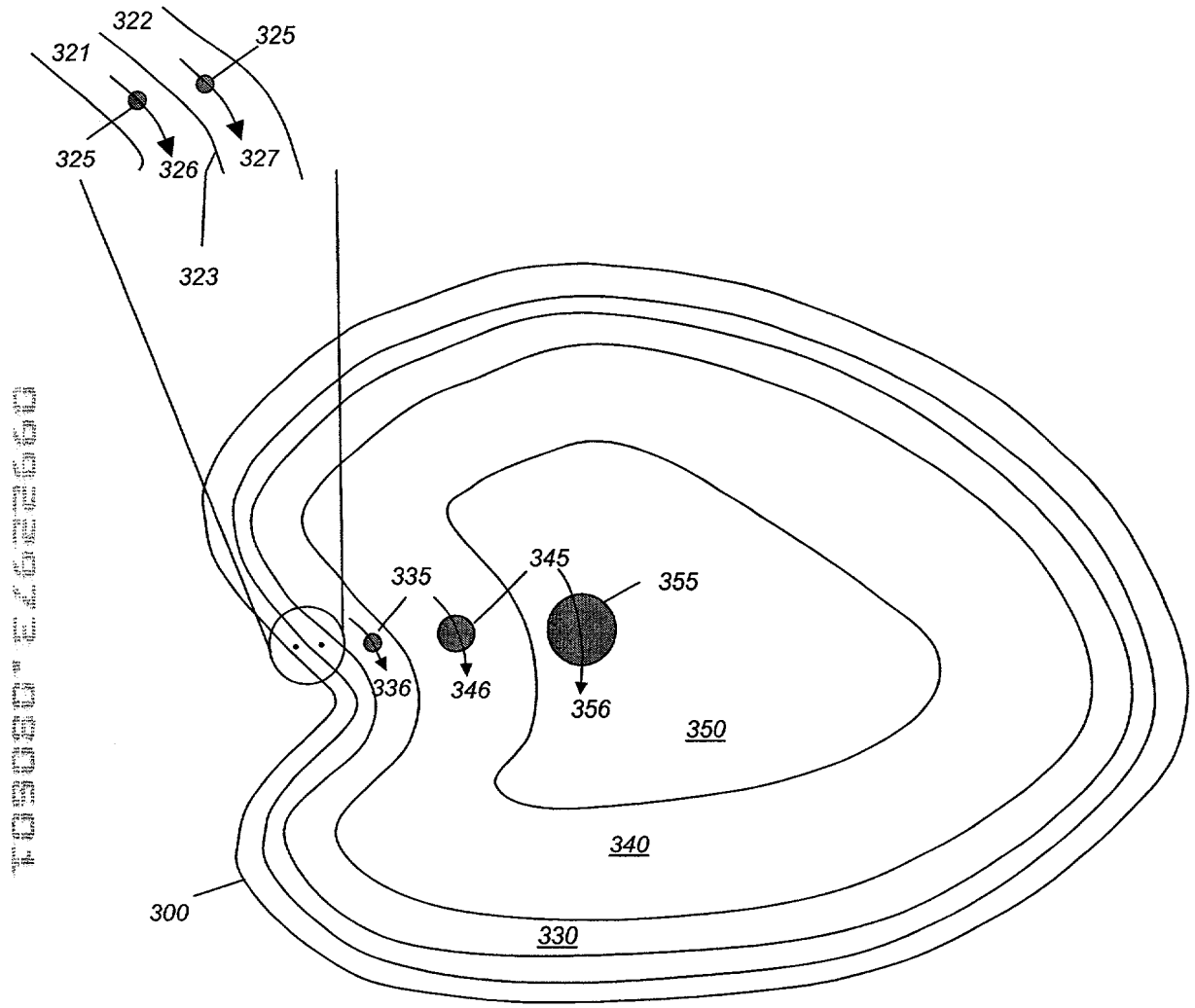

322
325
321
325
326
327
323
335
345
355
336
346
356
350
340
300
330

Figure 3.

Application Published

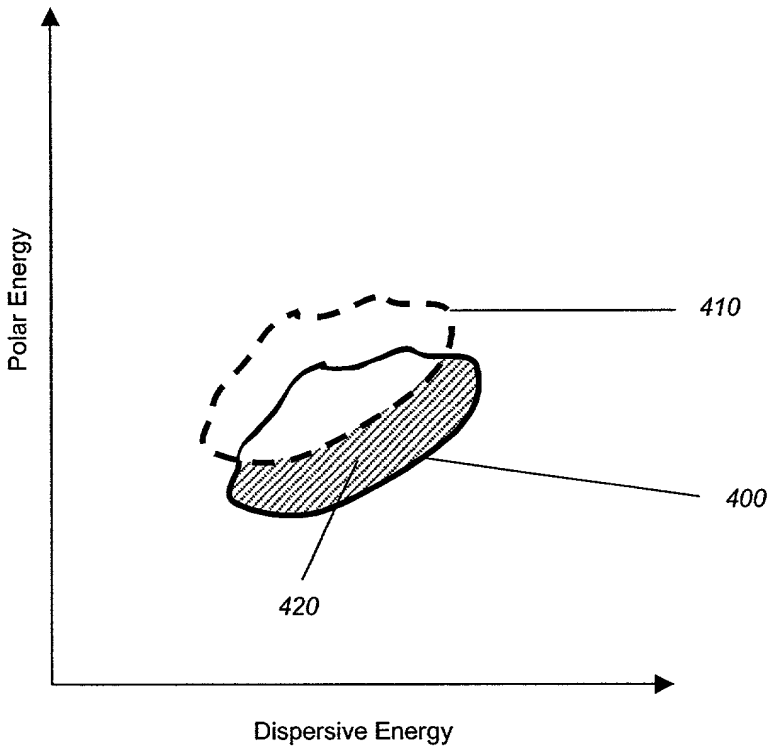


Figure 4.

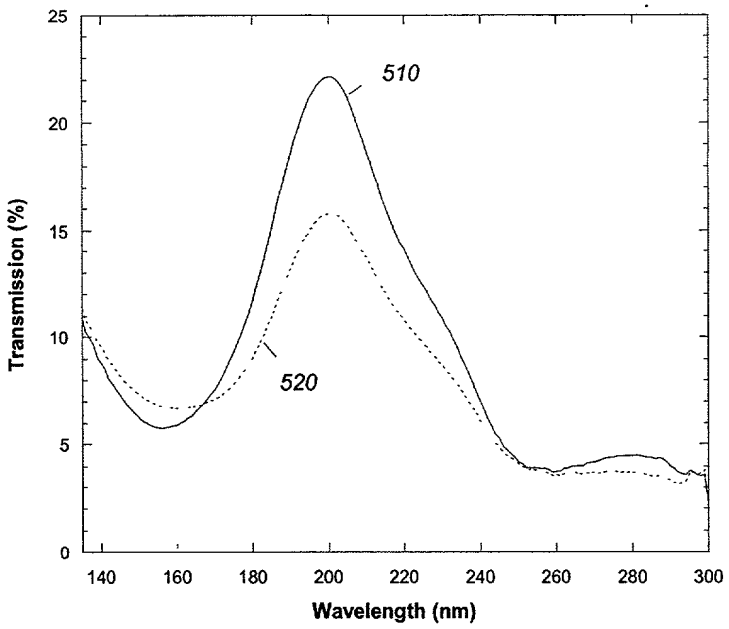

25
20
15
10
5
0
Transmission (%)
510
520
140
160
180
200
220
240
260
280
300
Wavelength (nm)

Figure 5.

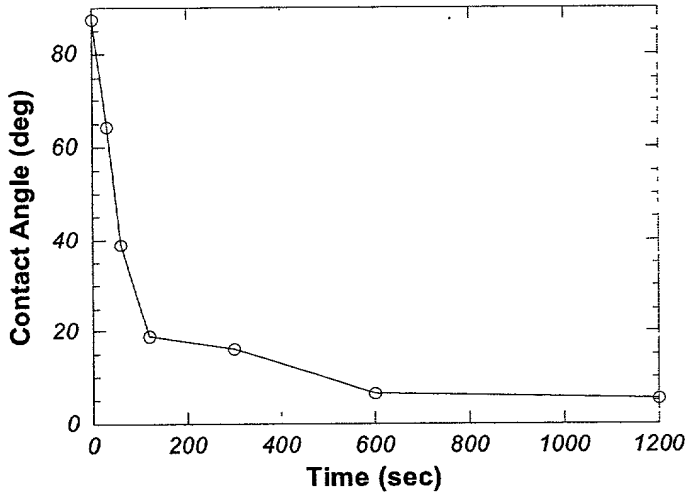


Figure 6a.

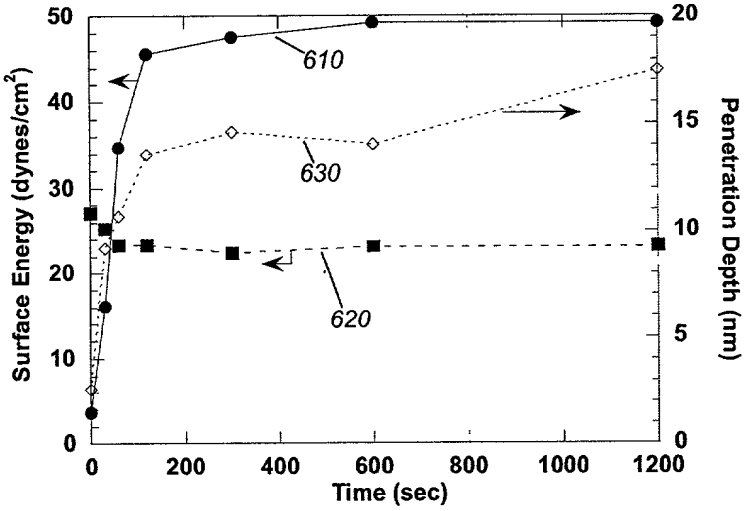


Figure 6b.

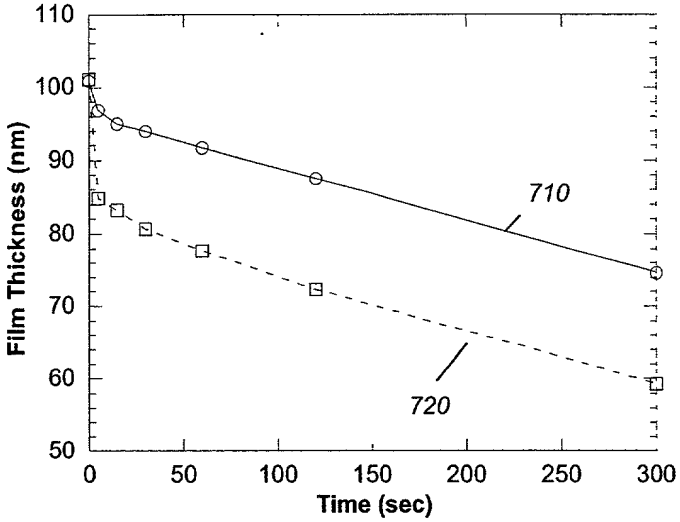


Figure 7a.

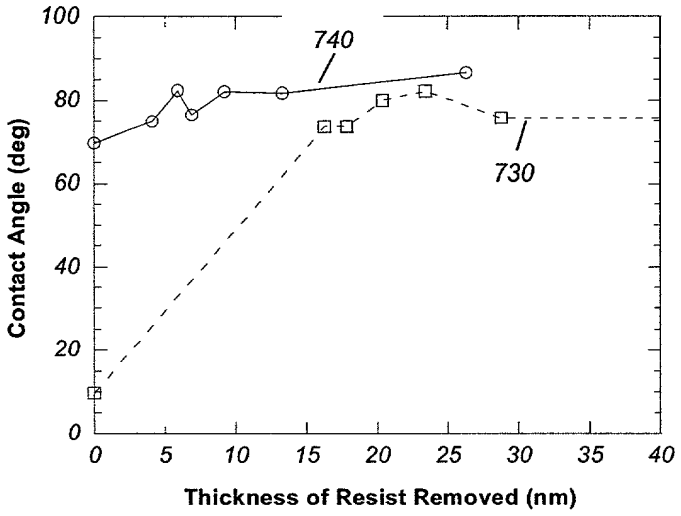
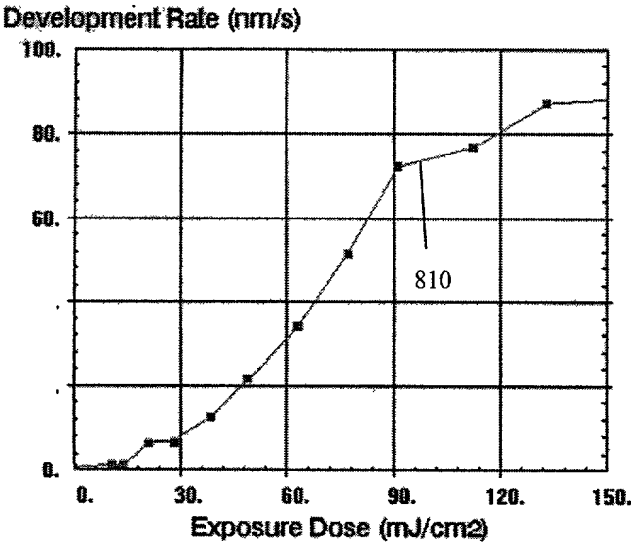


Figure 7b.

(a)


Development Rate (nm/s)
100.
80.
60.
0.
0.
30.
60.
90.
120.
150.
Exposure Dose (mJ/cm2)
810

(b)

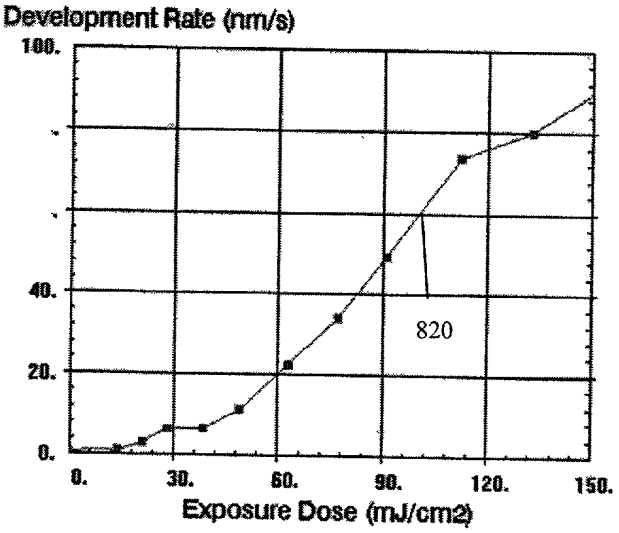

Development Rate (nm/s)
100.
40.
20.
0.
0.
30.
60.
90.
120.
150.
Exposure Dose (mJ/cm2)
820

Figure 8.

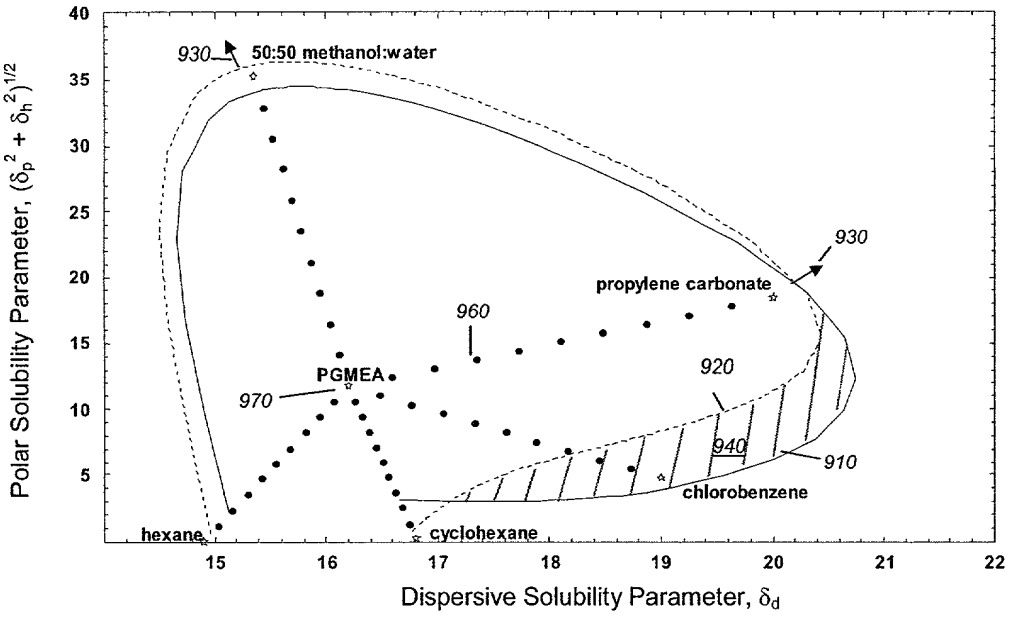


Figure 9.

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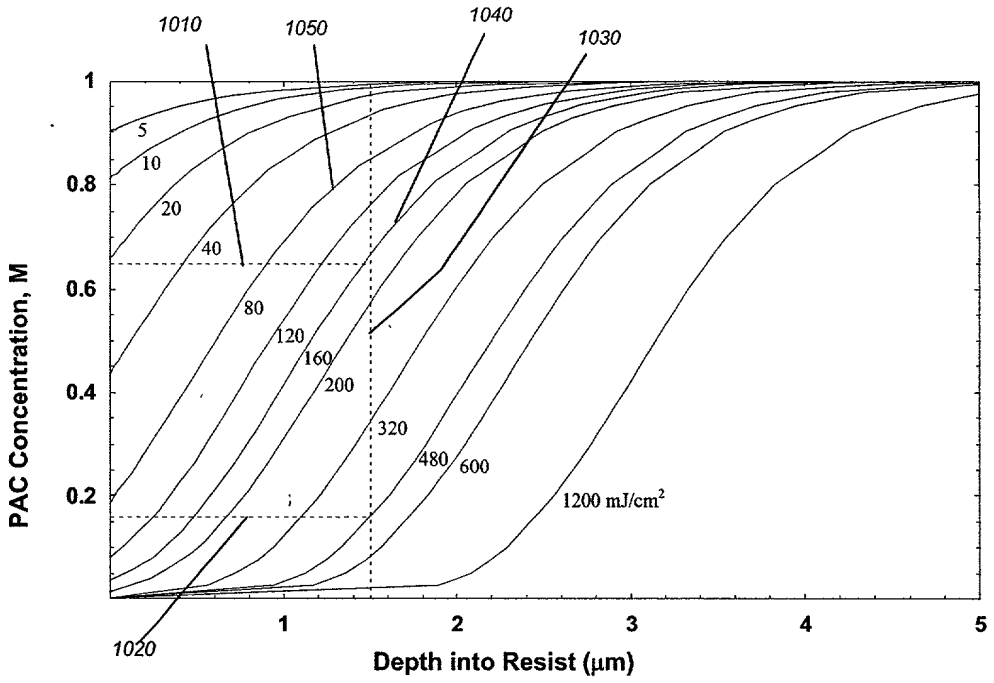

1010
1050
1040
1030
1020
5
10
20
40
80
120
160
200
320
480
600
1200 mJ/cm²
PAC Concentration, M
Depth into Resist (μm)
1
0.8
0.6
0.4
0.2
1
2
3
4
5

Figure 10.

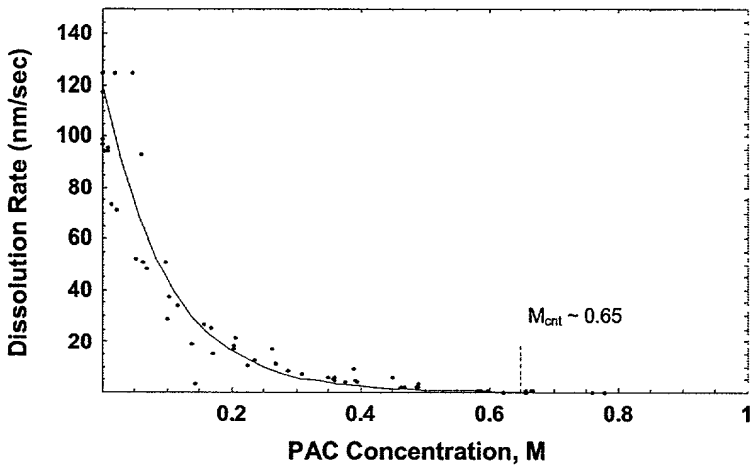


Figure 11.

T-5960 P.25/50 F-650

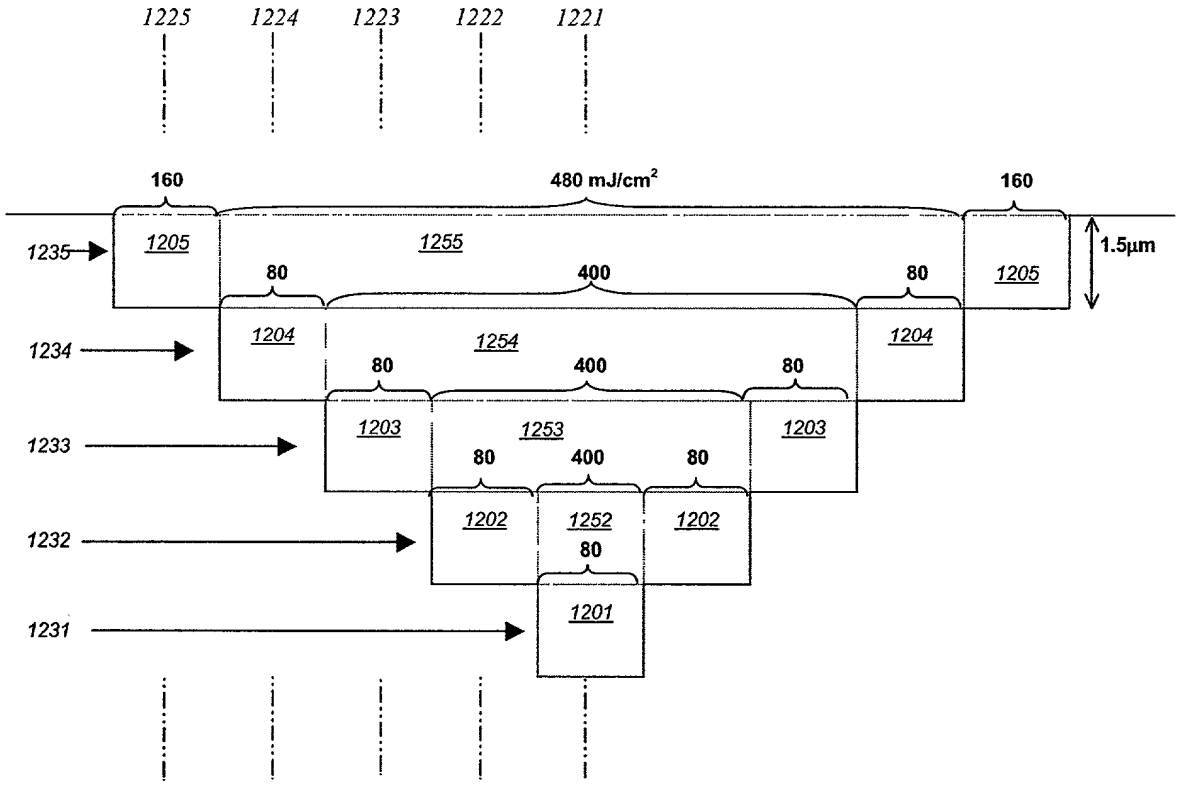
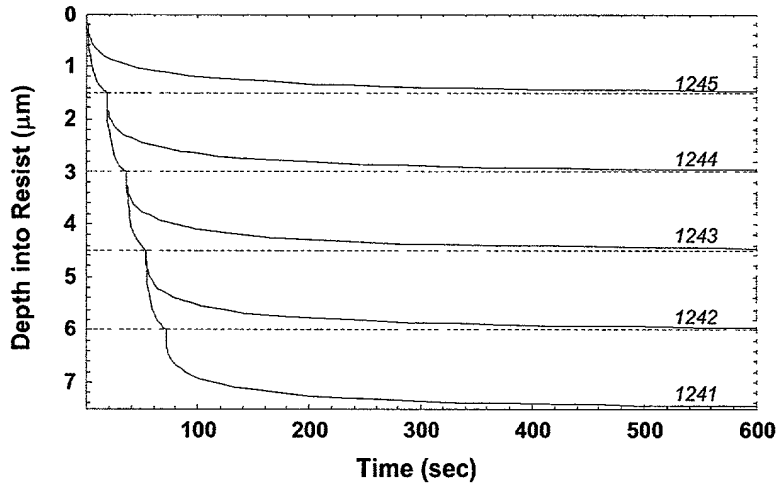


Figure 12a.



(b)

Figure 12b.

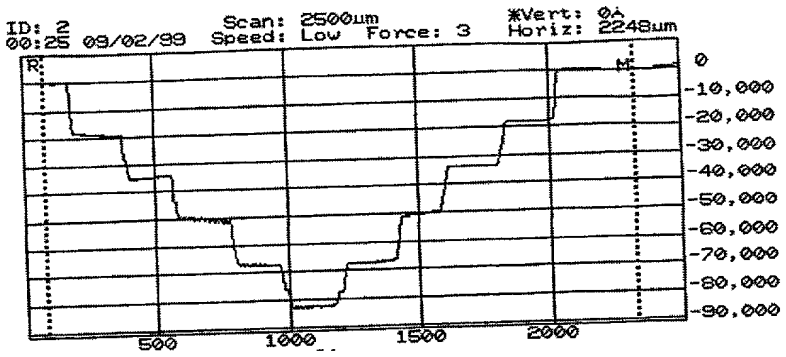


Figure 12c.

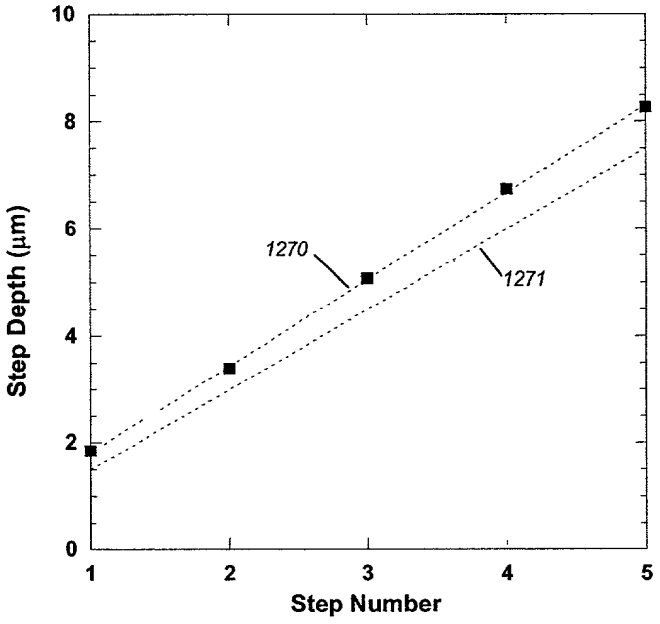


Figure 12d.

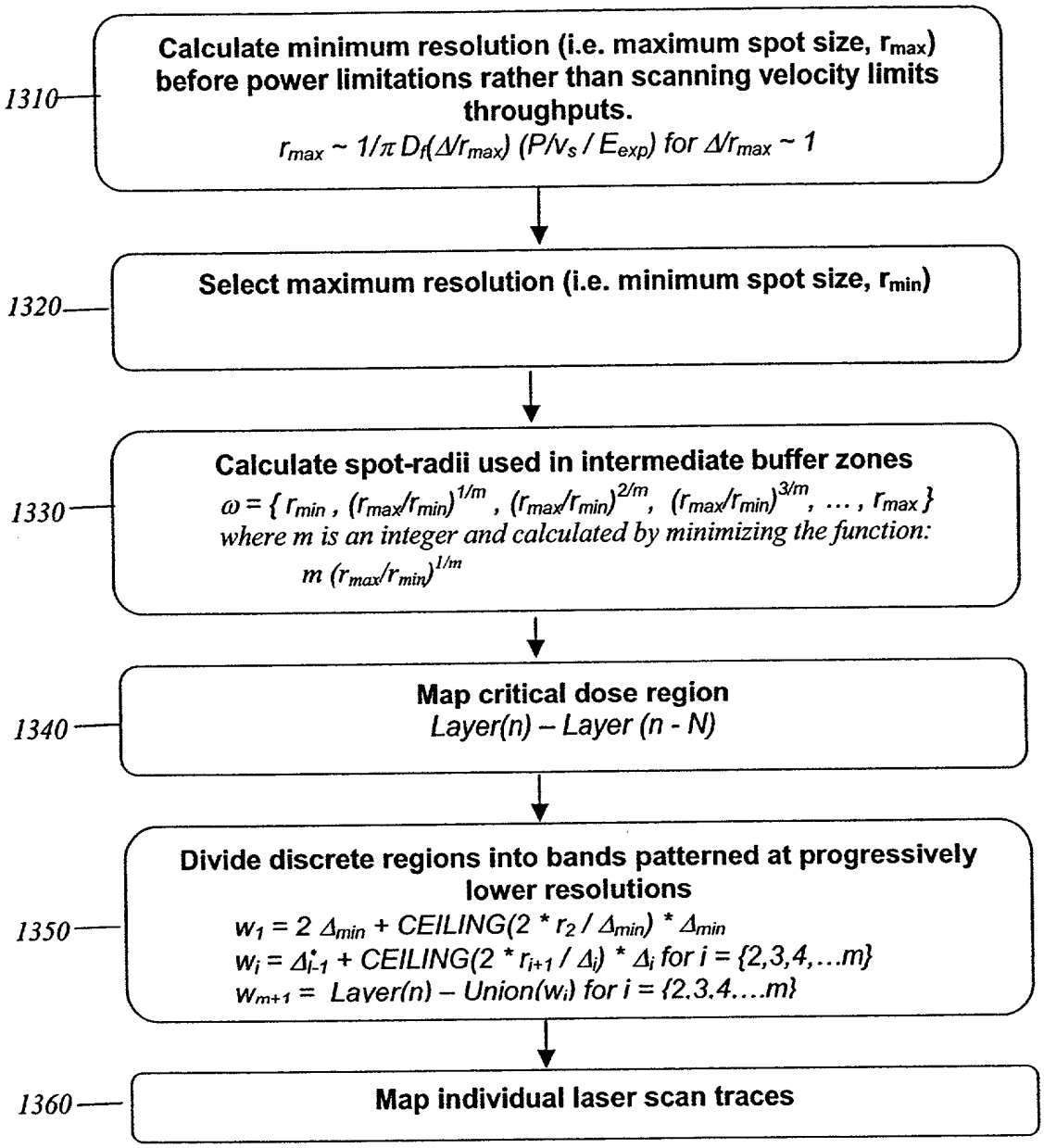

1310
Calculate minimum resolution (i.e. maximum spot size, r_{max}) before power limitations rather than scanning velocity limits throughputs.
$r_{max} \sim 1/\pi D_f(\Delta/r_{max}) (P/v_s / E_{exp})$ for $\Delta/r_{max} \sim 1$
1320
Select maximum resolution (i.e. minimum spot size, r_{min})
1330
Calculate spot-radii used in intermediate buffer zones
$\omega = \{ r_{min}, (r_{max}/r_{min})^{1/m}, (r_{max}/r_{min})^{2/m}, (r_{max}/r_{min})^{3/m}, \ldots, r_{max} \}$
where m is an integer and calculated by minimizing the function:
$m (r_{max}/r_{min})^{1/m}$
1340
Map critical dose region
Layer(n) – Layer (n - N)
1350
Divide discrete regions into bands patterned at progressively lower resolutions
$w_1 = 2 \Delta_{min} + CEILING(2 * r_2 / \Delta_{min}) * \Delta_{min}$
$w_i = \Delta^*_{i-1} + CEILING(2 * r_{i+1} / \Delta_i) * \Delta_i$ for $i = \{2,3,4,\ldots m\}$
$w_{m+1} =$ Layer(n) – Union(w_i) for $i = \{2.3.4.\ldots.m\}$
1360
Map individual laser scan traces

Figure 13.

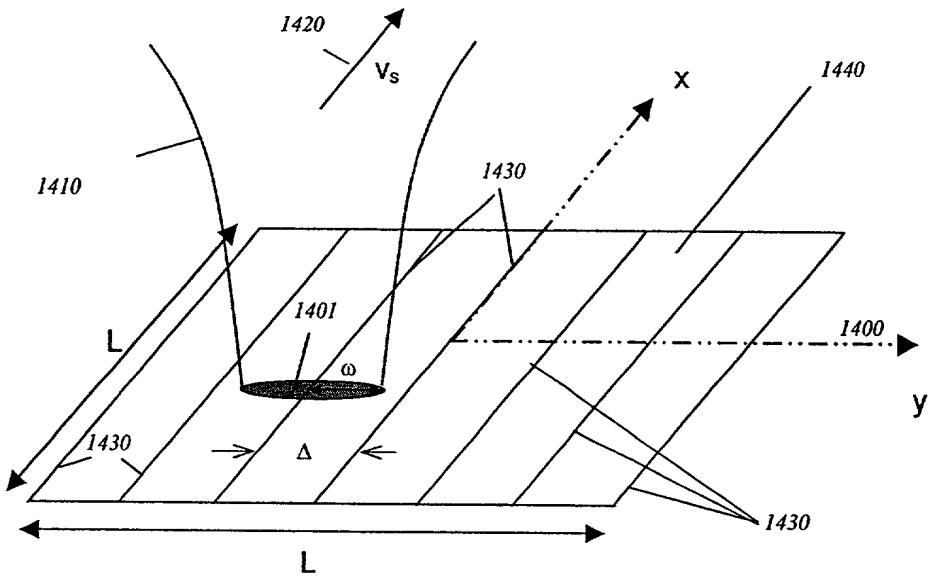


Figure 14.a

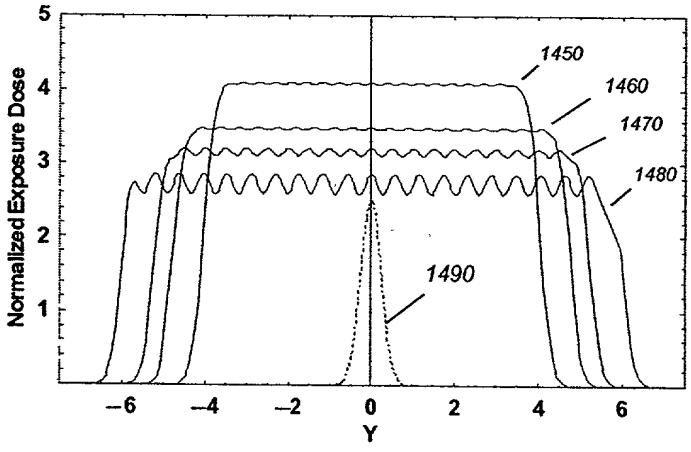
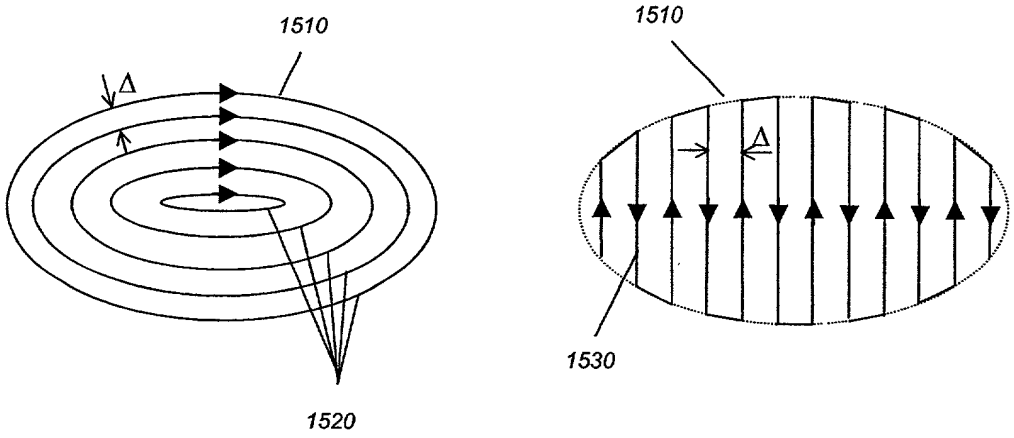


Figure 14.b



(a) (b)

Figure 15.

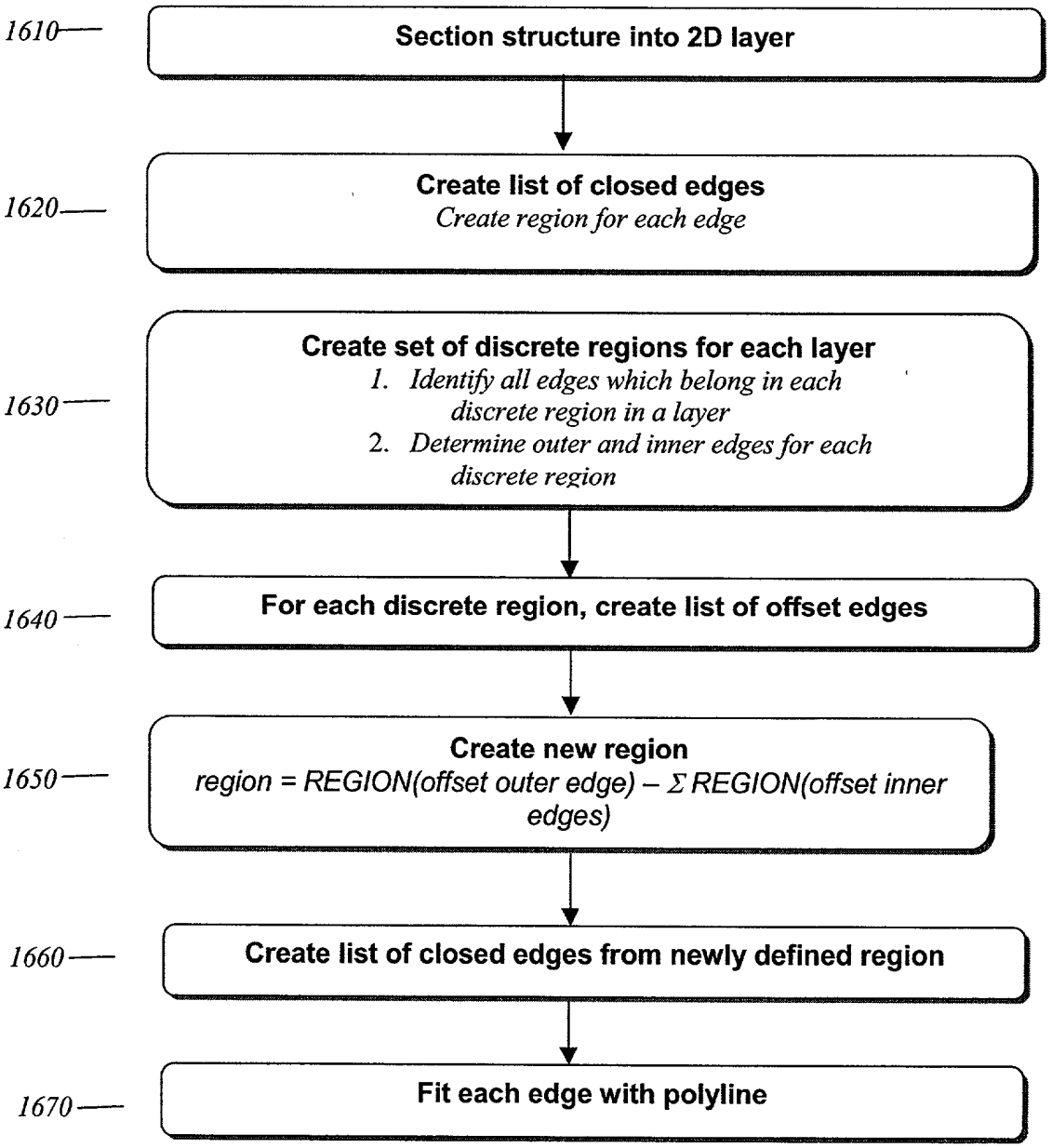

1610
Section structure into 2D layer
1620
Create list of closed edges
Create region for each edge
1630
Create set of discrete regions for each layer
1. Identify all edges which belong in each discrete region in a layer
2. Determine outer and inner edges for each discrete region
1640
For each discrete region, create list of offset edges
1650
Create new region
region = REGION(offset outer edge) – Σ REGION(offset inner edges)
1660
Create list of closed edges from newly defined region
1670
Fit each edge with polyline

Figure 16.

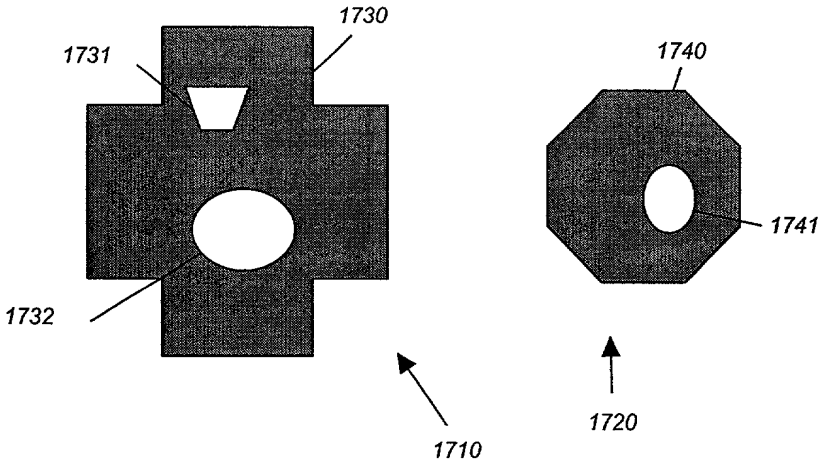


Figure 17.a

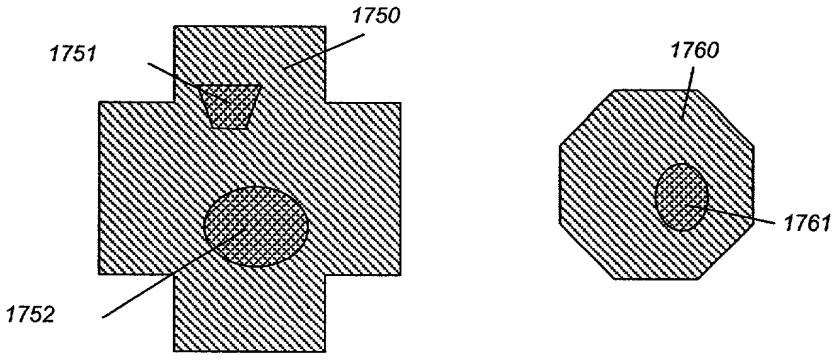


Figure 17.b

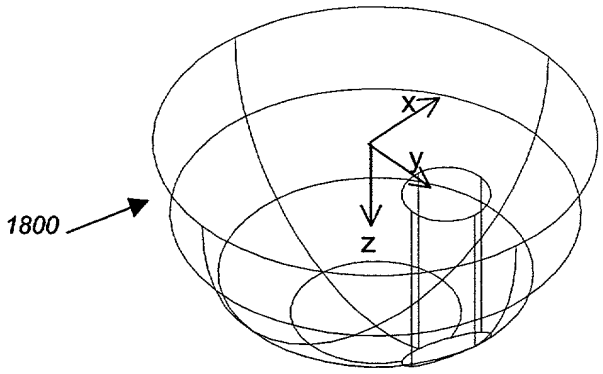


Figure 18.a

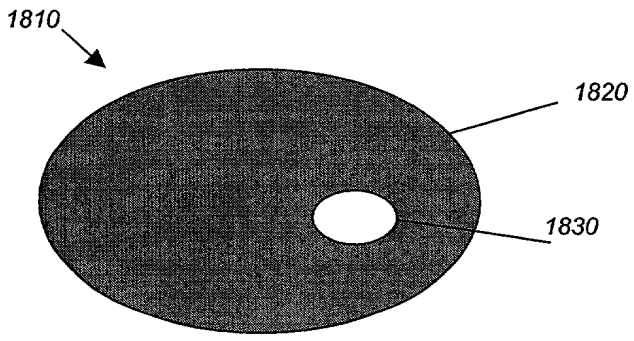


Figure 18.b

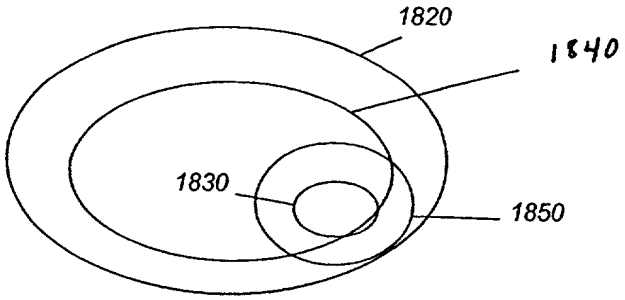


Figure 18.c

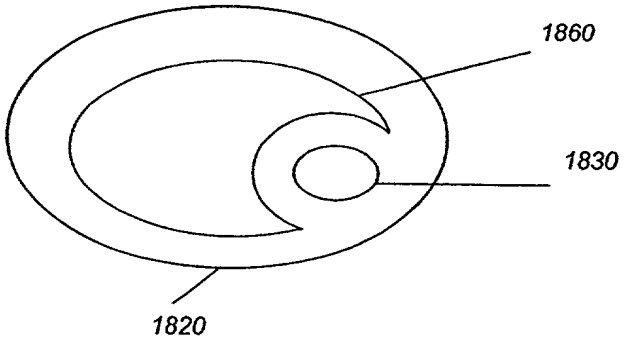


Figure 18.d

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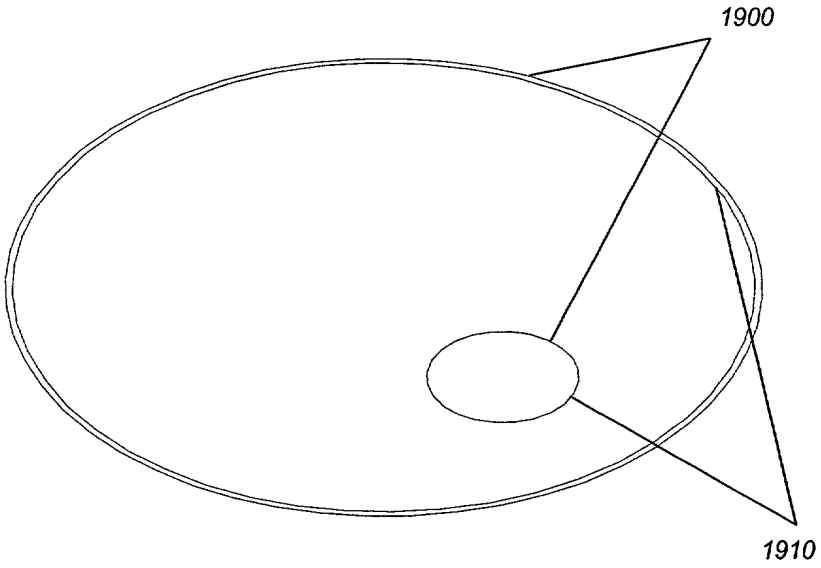

Figure 19.a

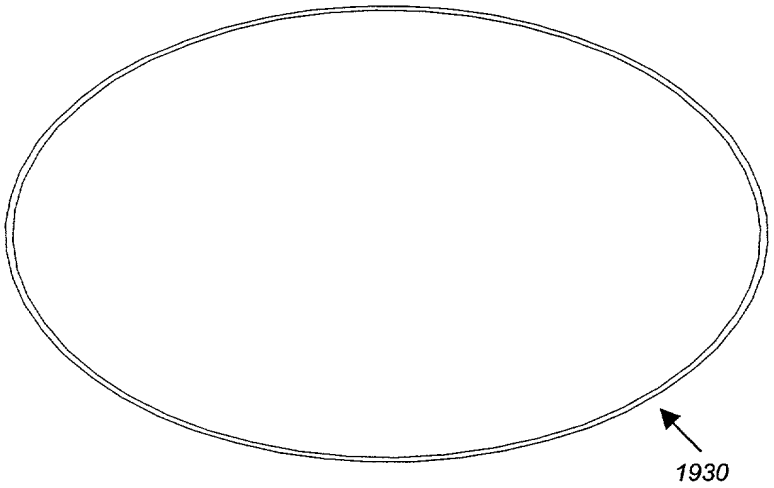

Figure 19.b

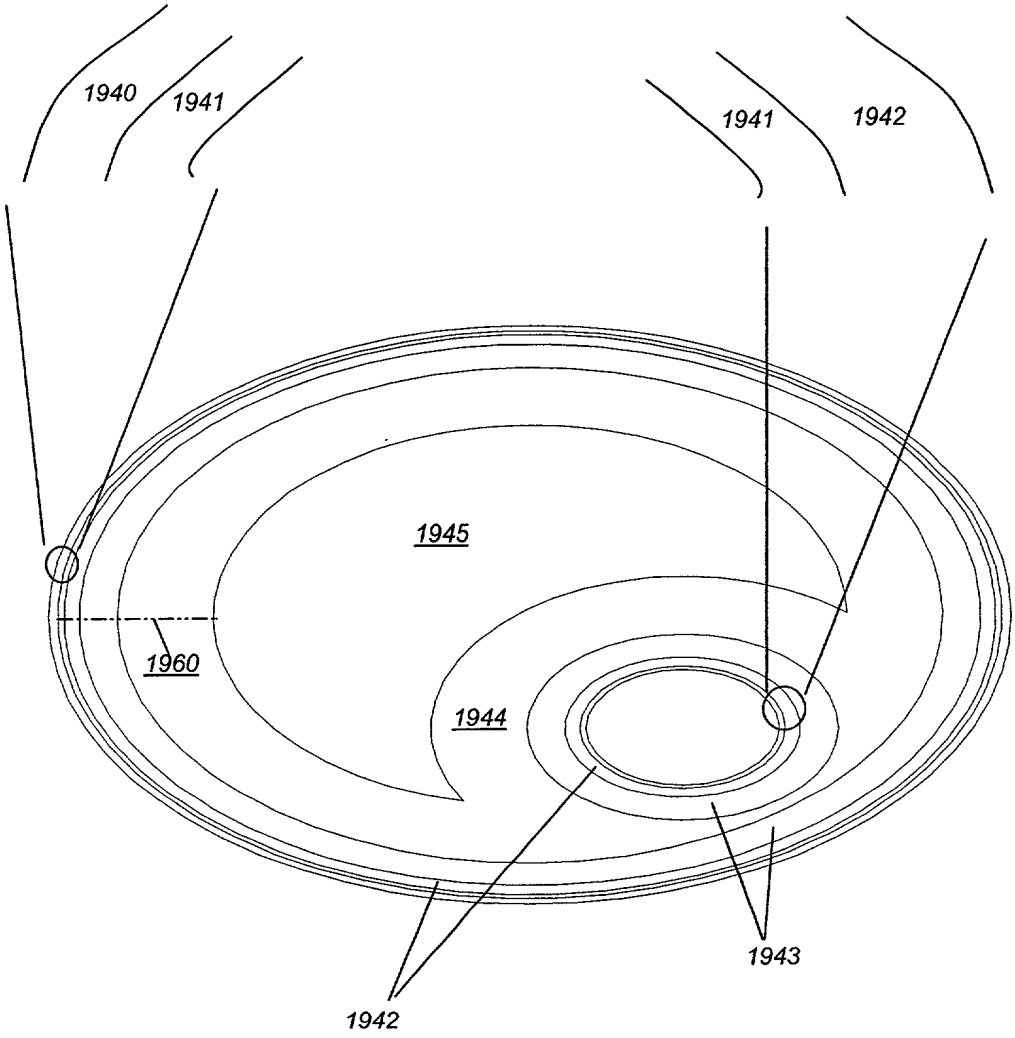

Figure 19.c

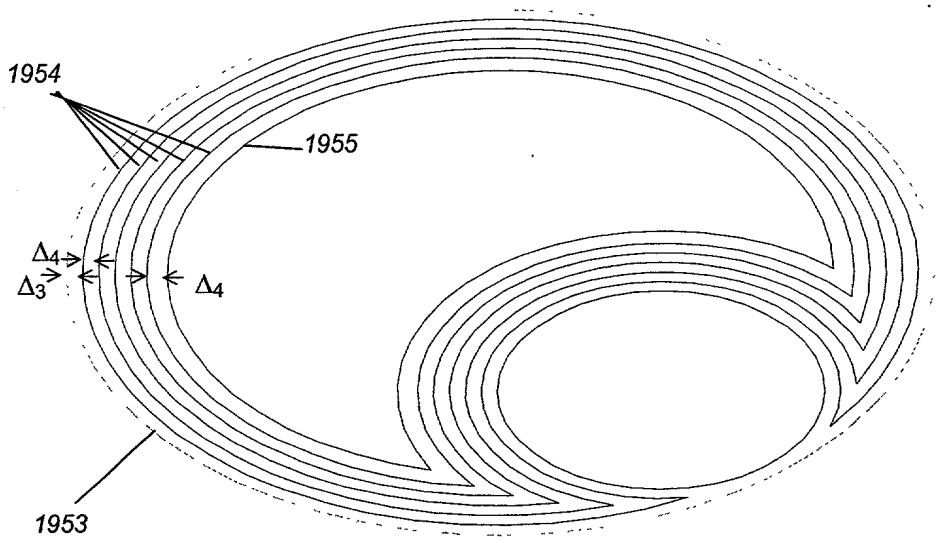

Figure 19.d

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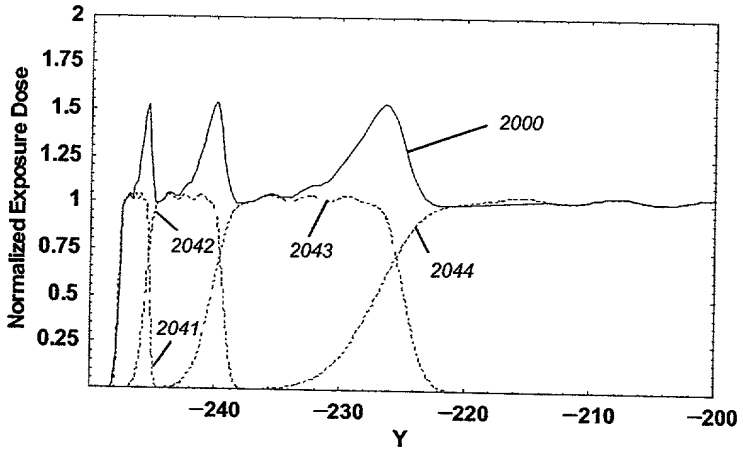

Figure 20.a

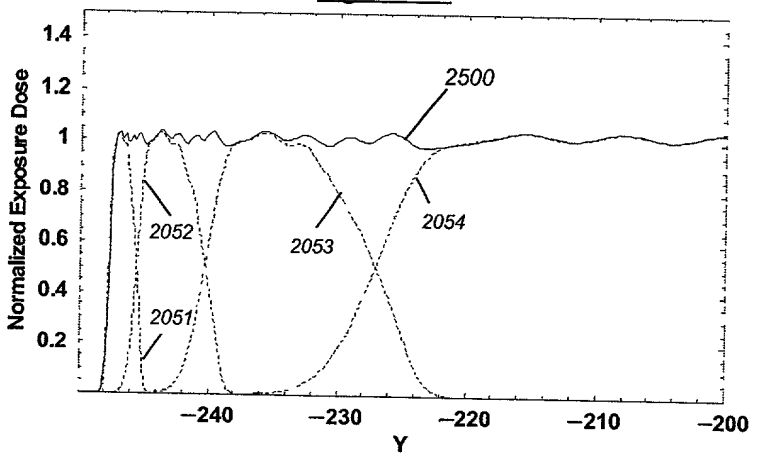

Figure 20.b